

IN THE CLAIMS

1. (currently amended) A disk controller, wherein:

in a disk subsystem provided with plural disk controllers, a communication means between the disk controllers, disk drives, and each disk interface between the disk controller and the each disk drive, the disk controller is provided with a cache memory and a control memory that stores the control information of the cache memory; and

the cache memory provided to one of the disk controller controllers that receives an access request from a host computer can access and store data for the disk drive connected to the disk controller provided with the cache memory via the disk interface and in addition, data for the disk drive connected to another at least one disk controller via the disk interface via the communication means;

wherein each of said disk controller controls the disk drive which connected to each of said disk controller via each disk interface.

2. (currently amended) A disk controller according to Claim 1, wherein:

for control information stored in the control memory, a cache directory for specifying a disk controller that stores data at the destination of access in its cache memory and a cache address for storing, by a unit of access, data at the destination of access ~~every unit of access~~ are stored ~~every unit of access~~ by said unit of access; and

wherein said unit of access is uniquely determined based upon a disk controller number and a disk drive address.

3. (currently amended) A method of controlling a cache memory of a disk controller, wherein: in a disk subsystem provided with plural disk controllers, a communication means between the disk controllers, disk drives and each disk interface between the disk controller and the disk drive, the disk controller is provided with each cache memory, each of said disk controller controls the disk drive which is connected to each of said disk controller via each disk interface;

the disk controller that receives an access request from a host computer processes the access request after the ~~exclusive~~ operation of excluding the other access request to the same access data and reports the completion to the host; and

afterward, in case access from the host computer is a request for update access and the disk controller except the disk controller that receives the access stores the access data in its cache memory, the exclusion of the access to the same data is released after coherence control operation.

4. (currently amended) A method of controlling a cache memory of a disk controller according to Claim 3, wherein: in case the destination of the update access is a disk drive connected to the disk controller other than the disk controller which receives an access request,

a said disk controller that receives a the access request for update access from a host computer stores, via a communication means between the disk controllers, update data received from the host computer via a communication means between the disk controllers in a cache memory of the disk controller

connected to the disk drive which is the destination of the update access via a disk interface ~~in case the destination of the update access is a drive connected to another disk controller except the disk controller via the disk interface.~~

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5. (currently amended) A method of controlling a cache memory of a disk controller according to Claim 4, said plural disk controllers store a cache directory which is an information for specifying a disk controller that stores data at the destination of access in its cache memory, and said method wherein: a disk controller that receives a request for read access from a host computer determines whether access data is stored in a cache memory in the disk controller that receives the request for access or not by referring to athe cache directory ~~according to Claim 2~~ of the disk controller ~~connected to a disk drive at the destination of access via a disk interface;~~

in case the data is stored in the cache memory of the disk controller that receives the request for access, the data is transferred to the host computer, referring to the cache memory ~~at once;~~

in case the data is not stored in the cache memory of the disk controller that receives the request for access, it is determined referring to the cache directory whether access data is stored in a cache memory of a disk controller connected to a disk drive at the destination of access via a disk interface or not;

in case the data is stored in a cache memory of a disk controller connected to a disk drive at the destination of access, the data is transferred to the cache memory

in the disk controller that receives the access request and the host computer, referring to the cache memory; and

in the meantime, in case the data is not stored in the cache memory of a disk controller connected to a disk drive at the destination of access, the data is transferred₁ from the disk drive at the destination of access₁ ~~to the cache memory of the disk controller connected~~ to the cache memory of the disk controller connected to the disk drive at the destination of access via the disk interface, and to the cache memory in the disk controller that receives the access request₁ and to the host computer.

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6. (currently amended) A method of controlling a cache memory of a disk controller according to ~~any of Claims claim 3 to 5~~, wherein: after storing the update data stored in a cache memory is stored in a the disk drive at the destination of access connected to a disk controller via a disk interface; and further, the same update data in a the cache memory storing the update data in a disk subsystem of another the other disk controller is invalidated.

7. (currently amended) A method of controlling a cache memory of a disk controller, wherein: in a disk subsystem provided with plural disk controllers, a communication means between disk controllers, disk drives, each disk interface between the disk controller and the disk drive, each disk controller is provided with a cache memory, each of said disk controller controls the disk drive which is connected to each of said disk controller via each disk interface;

the cache memory stores only write data or read data only data of the disk drive connected to the disk controller via the disk interface;

in case an access request from a host computer is read access, data is transferred to the host computer from a cache memory of a disk controller connected to a the disk drive at the destination of the request or from the disk drive itself ~~to the host computer~~; or

in case an access request from a host computer is update access, data is transferred to a cache memory of a disk controller connected to a disk drive at the destination of the request via a disk interface.

8. (currently amended) A method of controlling a cache memory of a disk controller according to ~~any of Claims 3 to claim 7~~, wherein: an area of a cache memory is divided into an area in which data for a disk drive connected to a disk controller that receives access via a disk interface is stored and an area in which data for a disk drive connected to another disk controller in a subsystem via a disk interface is stored and is managed.

9. (currently amended) A method of controlling a cache memory of a disk controller according to ~~any of Claims 3 to claim 8~~, wherein: data for a disk drive connected to a disk controller that receives access from a host computer via a disk interface is stored with the data doubled or multiplexed in a cache memory; and

in the meantime, data for a disk drive connected to another disk controller in a subsystem via a disk interface is stored in a cache memory without being multiplexed ~~in a cache memory~~.

10. (currently amended) A method of controlling a disk controller, wherein:

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in a disk subsystem provided with plural disk controllers, a communication means between disk controllers, disk drives and each disk interface between the disk controller and the disk drive, each disk controller is provided with a cache memory, each of said disk controller controls the disk drive which is connected to each of said disk controller via each disk interface; and

in a method of controlling a cache memory in which the cache memory can also store data of a disk drive connected to another disk controller in the subsystem via a disk interface, in case a ~~trouble~~ error occurs in a certain disk controller in the subsystem, data of a disk drive connected to the disk controller where the ~~trouble~~ error occurs via a disk interface, which is stored in a cache memory of a normal disk controller, is invalidated.

11. (currently amended) A disk controller according to Claimsclaim 1 and 2, wherein: a cache memory with which a disk controller is provided is composed of a nonvolatile cache memory storing data for a disk drive connected to a disk controller that receives access via a disk interface and a volatile cache memory storing data for a disk drive connected to another disk controller in a subsystem via a disk interface.

12. (currently amended) A disk controller according to ~~any of Claims~~ claim 1, wherein: a communication means between disk controllers is a connection acquired by expanding an interconnection in the disk controller.

A1 13. (currently amended) A disk controller according to ~~any of Claims~~ claim 1, wherein: in a disk subsystem provided with plural disk controllers, a communication means between disk controllers, disk drives and each disk interface between the disk controller and the disk drive, the disk drive is provided with a logical disk inside drives are logically segmented into logical disk; and

the disk controller stores the access frequency information of a channel, the disk controller and the logical disk as the control information of a cache memory provided in the disk controller.

14. (currently amended) A method of controlling a disk controller according to Claim 13, wherein:

it is determined whether a channel the access frequency of which is the highest of channels that receive access to a logical disk and the logical disk at the destination of access are connected to the same disk controller via a disk interface or not;

in case they are not connected to the same disk controller, the logical disk is relocated in a disk drive connected to a disk controller to which a channel the access frequency of which is the highest is connected via disk interface; and

in case they are connected to the same disk controller, a host computer that accesses to the logical disk and uses another channel uses a channel of a disk controller connected to a disk drive provided with the logical disk via a disk interface.

15. (currently amended) A method of controlling a cache memory of a disk controller according to ~~any of Claims~~ claim 7, wherein:

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an area of a cache memory is divided into an area in which data for a disk drive connected to a disk controller that receives access via a disk interface is stored and an area in which data for a disk drive connected to another disk controller in a subsystem via a disk interface is stored and is managed.

16. (currently amended) A method of controlling a cache memory of a disk controller according to ~~any of Claims~~ claim 8, wherein: data for a disk drive connected to a disk controller that receives access from a host computer via a disk interface is stored with the data doubled or multiplexed in a cache memory; and

in the meantime, data for a disk drive connected to another disk controller in a subsystem via a disk interface is stored without being multiplexed in a cache memory.

17. (new): A method of controlling a cache memory of a disk controller according to claim 3,

wherein an area of a cache memory is divided into an area in which data for a disk drive connected to a disk controller that receives access via disk interface is

stored and an area in which data for a disk drive connected to another disk controller in a subsystem via a disk interface is stored and is managed.

AI 18. (new): A method of controlling a cache memory of a disk controller according to claim 3,

wherein data for a disk drive connected to a disk controller that receives access from a host computer via a disk interface is stored with the data doubled or multiplexed in a cache memory; and

in the meantime, data for a disk drive connected to another disk controller in a subsystem via a disk interface is stored in a cache memory without being multiplexed.